

ORIGINAL RESEARCH

Epidemiological and clinico-pathological characteristics of triple negative breast cancer (TNBC) – An institutional experience

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ABSTRACT

Objective: To study the Epidemiological & Clinicopathological characteristics Of Triple Negative Breast Cancer.

Methods: This descriptive cross-sectional study was conducted at a tertiary health centre over the period of 2 years from 2020-2022. The study sample included 100 patients of Biopsy and Immunohistochemistry proven Triple Negative Breast Cancer (TNBC). Age at diagnosis, race, histological grade, tumor size, nodal status, distant metastases, postoperative TNM staging, molecular subtypes, surgical performance, receipt of radiation, and chemotherapeutic administration were among the clinicopathological parameters included in analyses.

Results: Mean age of the 100 study sample was 54.78 years (standard deviation – 5.42 years), with the highest at 66 years and the lowest at 44 years. 44% of TNBC subjects were having stage III disease followed by 32% with stage I & 24% with stage IV disease. 24% of TNBC subjects were having metastasis lesions in other parts of the body while the remaining 76% were without metastasis. 45% of TNBC subjects were having stage III disease followed by 32% with stage I & 23% with stage IV disease according to pathological staging. 23% of TNBC subjects were having recurrence within two years after treatment while the remaining 77% were completely cured.

Conclusion: Triple-negative breast cancer is a distinct subtype of the disease that is characterized by a distinct molecular profile, an aggressive pattern of activity, a relative dearth of effective treatments, and a dismal outlook. This subtype carries an adverse prognosis which is even more exemplified in developing countries like India where the relatively lower socio-economic status and lack of awareness about the condition as well as lack of availability of more targeted therapies further add to the morbidity & mortality already associated with the illness. In order to combat this one-of-a-kind and aggressive disease and tailor our approach we need to conduct more extensive research so as to be able to provide the best standard of care to these patients.

Keywords: Triple Negative Breast Cancer, TNM, Metastasis.

INTRODUCTION

Breast cancer over the past few decades has emerged as a heterogeneous disease owing to the diversity in its presentation, a wide battery of investigations, variable prognosis, and

extensive therapeutic alternatives. Over the years multiple classification systems have been devised with immunohistochemical staging being the latest entrant.¹

Perou et al. presented a unique classification for breast cancer in 2000 that highlighted four subtypes: luminal, HER2-positive, basal-like, and normal breast each with a different clinical profile and prognosis.^{2,3} Any breast cancer that lacks or has low levels of the estrogen receptor (ER), the progesterone receptor (PR), and the over expression and amplification of the human epidermal growth factor receptor 2 (HER2) is known as triple-negative breast cancer (TNBC).⁴ Triple-negative breast cancer accounts for 5–20% of all instances of breast cancer.

TNBC has been shown to be more aggressive than hormone receptor-positive breast cancer. Within the first 8 years following diagnosis, one-third of TNBC patients will have a distant recurrence.^{8,9} Owing to the paucity of data pertaining to TNBC cases in India and for a better understanding of the illness, we through our current research aim to throw light on the epidemiological and clinicopathological characteristics of Triple Negative Breast Cancer.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted at a tertiary health centre over the period of 2 years from 2020-2022. The study sample included 100 patients of Biopsy and Immunohistochemistry proven Triple Negative Breast Cancer (TNBC). These patients based on their clinical TNM (cTNM) stage were subjected to either neo adjuvant chemotherapy followed by Breast Conservation Surgery or upright Modified Radical Mastectomy. The patients then received adjuvant chemotherapy/radiotherapy based on final histopathological grading and aggressiveness of the tumor.

Age at diagnosis, race, histological grade, tumor size, nodal status, distant metastases, postoperative TNM staging, molecular subtypes, surgical performance, receipt of radiation, and chemotherapeutic administration were among the clinicopathological parameters included in analyses. The study patients were followed up after 6 months, 1 year and 2 years wherein detailed physical examination and mammography will be carried out to look for early recurrence. Data was computed in Microsoft Excel and analyzed using the SPSS software 16 version.

RESULTS

• EPIDEMIOLOGICAL PARAMETERS

Mean age of the 100 study sample was 54.78 years (standard deviation – 5.42 years), with the highest at 66 years and the lowest at 44 years. 32% of samples were from the 56 - 60 years age group followed by 24% of subjects from the 46-50 & 51-55 years age group each. 31% of TNBC subjects belong to class IV (Upper lower class) followed by 26% from class III (Lower middle class) according to Modified Kuppu swami Scale. 86% TNBC subjects were having menarche > 14 years while remaining 14% at ≤ 14 years. The mean age of menarche among study subjects was 15.6 years with a standard deviation of 1.06 years.

• CLINICO-PATHOLOGICAL PARAMETERS

44% of TNBC subjects were having stage III disease followed by 32% with stage I & 24% with stage IV disease. 24% of TNBC subjects were having metastasis lesions in other parts of the body while the remaining 76% were without metastasis. 45% of TNBC subjects were having stage III disease followed by 32% with stage I & 23% with stage IV disease according to pathological staging. Invasive ductal carcinoma (76%) was the most common type among TNBC subjects followed by invasive lobular carcinoma (18%) and mucinous type in 3% of subjects. 23% of TNBC subjects were having lymph node involvement while the remaining 77% were without it.

• MANAGEMENT AND PROGNOSIS:

78% of TNBC subjects were treated by modified radical mastoidectomy with adjuvant

chemotherapy while 22% of subjects were on neoadjuvant chemotherapy. 23% of TNBC subjects were having recurrence within two years after treatment while remaining 77% were completely cured.

Table No:1 - Age-Wise Distribution

Age (Months) Statistics	
N	100
Mean	54.78
Std. Error Of Mean	.545
Std. Deviation	5.418
Range	22
Minimum	44
Maximum	66

Table No: 2 – Distribution Of Cases Based On Socioeconomic Status (Assessed Using Modified Kuppuswami Scoring System)

Modified Kuppuswami Scale	Number of Patients	% of Patients
Class I	0	0
Class II	26	26
Class III	28	28
Class IV	31	31
Class V	15	15

Table No: 3 – Distribution Of Cases Based On Pre-Operative cTNM Stage At Presentation Among TNBC Patients.

'TNM' Staging	Number of Patients	% of Patients
I	0	00
II	32	32
III	44	44
IV	24	24

Table No: 4 – Distribution of Cases Based on Presence Of Metastasis At Presentation Among TNBC Study Patients.

Metastasis at Presentation	Number of Patients	% of Patients
Present	24	24
Absent	76	76

Table No: 5 – Distribution of Cases Based on Post-Operative pTNM Stage Among TNBC Patients.

'pTNM' Staging	Number of Patients	% of Patients
I	0	00
II	32	32
III	45	45
IV	23	23

Table No: 6 – Distribution of Cases Based on The Treatment Offered To TNBC Patients Based on Stage.

Treatment	Frequency	Percent
Neoadjuvant Chemotherapy	22	22.0
Surgery + Adjuvant Chemotherapy	78	78.0
Total	100	100

DISCUSSION

Triple Negative Breast Cancer is an aggressive and multi-faceted illness with a wide spectrum of presentations and thus is cause for worry. The disease's pathophysiology may range from a moderate form to a severe condition with a high risk of recurrence, depending on the severity of the illness. The inefficiency of treatments that are aimed at the ER, PR, and Her2 receptors is one of the most significant problems that arise while attempting to treat TNBC. Therapies developed in recent years that are aimed at combating these three receptors have shown significant promise as potential breast cancer treatments. The fact that targeted chemotherapeutic agents for TNBC are still under evaluation and even when available are out of reach of the middle-income population, is the primary factor contributing to the difficulty of treating this kind of cancer. TNBCs, on the other hand, have been found to have survival rates that are comparable to those that can be attained with targeted therapy in other forms of breast cancer if they are diagnosed at an early stage and given the appropriate treatment.¹⁰

In the current study, the mean age of the 100 patients in the study sample was 54.78 years old (with an SD of -5.42 years), with the highest age being 66 years old and the lowest age being 44 years old. This result was comparable to that of Thike et al. and Rao et al.,^{11,12} This difference in the age of presentation could be attributed to smaller sample size and the strata of the population visiting our center.

According to the findings of Yang and colleagues, there was not a statistically significant difference in the age of menarche between TNBC and other types of breast cancer¹¹³ similar to the observations in our study. From our research, we extracted that 45% of TNBC subjects were having stage III disease by followed by 32% with stage I & 23% with stage IV disease according to pathological staging, which was in line with findings of study by Verma et.al.

Majority of the patients included in the study presented with an advanced stage of the disease comparable to research that was conducted by Ishitha G. et al¹¹³, which showed that 46% of the patients had Grade II tumors, whereas 54% of the cases had Grade III tumors. The above findings of the advanced stage of disease at presentation are very likely accentuated by poor socioeconomic status and paucity of advanced healthcare in rural India and could be therefore one of the fatal causes for poor 5-year survival rates seen in patients with TNBC.

In the research that we conducted, 23% of TNBC patients had recurrence within two years after therapy, while the remaining 77% were totally cured. While the recurrence rate was relatively low in Sarin R et al¹⁴, with only 11.7% of the patients known to have recurrence, the recurrence rate was much higher in comparable research by Zhang et al.,¹⁵ whereby the recurrence rate was 19%. Such high recurrence rates cannot be attributed to a single cause as multiple factors bear the responsibility such as lack of research in developing countries causing a lag in the availability of targeted therapeutic drugs, especially at affordable prices or lack of exposure amongst the target population.

CONCLUSION

Triple-negative breast cancer is a distinct subtype of the disease that is characterized by a distinct molecular profile, an aggressive pattern of activity, a relative dearth of effective treatments, and a dismal outlook. In the past decade, Triple Negative Breast Cancer (TNBC) has emerged as an extremely aggressive subtype both in terms of advanced stage at presentation and poor prognosis and 5-year survival rates. This subtype carries an adverse prognosis which is even more exemplified in developing countries like India where the relatively lower socio-economic status and lack of awareness about the condition as well as lack of availability of more targeted therapies further add to the morbidity & mortality already associated with the illness.

Our study had some limitations such as a smaller sample size and the short period of follow-up. However, we intend to continue this research over a larger sample population thereby providing more accurate data representative of the target population. In order to combat this one-of-a-kind and aggressive disease and tailor our approach we need to conduct more extensive research so as to be able to provide the best standard of care to these patients.

CONFLICT OF INTEREST

None

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